

APRIL 4, 2018



a member of **The GEL Group** INC



REV. 0

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171
F 843.766.1178

gel.com

March 29, 2018

Mr. Scot Fitzgerald
CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352

Re: CHPRC SAF W18-002
Work Order: 445441
SDG: GEL445441

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on March 08, 2018. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4505.

Sincerely,

A handwritten signature in cursive script that reads "Heather Shaffer".

Heather Shaffer
Project Manager

Purchase Order: 300071 -7H
Chain of Custody: W18-002-078, W18-002-081, W18-002-082 and W18-002-084
Enclosures

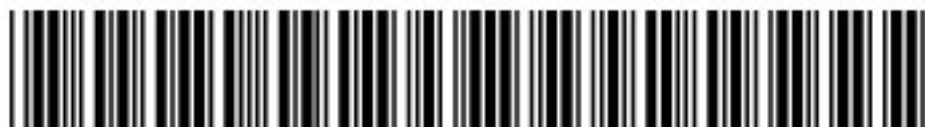


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Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF W18-002
SDG: GEL445441**

March 29, 2018

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary

Sample receipt

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on March 08, 2018, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Items of Note All efforts were made by the lab to meet any short hold times. Samples that were analyzed outside of the initial hold time but still within 2X hold time will be noted in the lab case narrative.

Sample Identification

The laboratory received the following samples:

<u>Laboratory Identification</u>	<u>Sample Description</u>
445441001	B3H3P3
445441002	B3H3P0
445441003	B3H3T0
445441004	B3H3K2
445441005	B3H3J9
445441006	B3H3L8

Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: General Chemistry and Metals.

We certify that this package is in compliance with the SOW, both technically and for completeness, including a full description of, explanation of, and corrective actions for, any and all deviations, from either the analyses requested or the case narrative requested. Release of the data contained in this hard copy data package has been authorized by the Laboratory Analytical Manager (or designee) and the laboratory's client services representative as verified by their signatures on this report.



Heather Shaffer
Project Manager

Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL445441
Work Order #: 445441

Metals

Determination of Metals by ICP

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Method Blank (MB) Statement

The method blanks (MB) analyzed with this SDG met the acceptance criteria. However, where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

Sample	Analyte	Value
1203986126 (MB)	Potassium	54.4 between (50 - 75)

Determination of Metals by ICP-MS

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Method Blank (MB) Statement

The method blanks (MB) analyzed with this SDG met the acceptance criteria. However, where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

Sample	Analyte	Value
1203986116 (MB)	Molybdenum	0.204 between (0.2 - 0.25)
	Tin	1.36 between (1 - 2.5)

Determination of Metals by ICP-MS

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Matrix Spike (MS/MSD) Recovery Statement

The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analyte. The post spike recovery was within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recovery may be attributed to possible sample matrix interference and/or non-homogeneity.

Sample	Analyte	Value
1203993121 (Non SDG 445432003MS)	Zinc	74* (75%-125%)

General Chemistry

Cyanide, Total

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Sample Dilutions

The following samples 1203986678 (B3H3P3DUP), 1203986680 (B3H3P3MS), 445441001 (B3H3P3), 445441004 (B3H3K2) and 445441005 (B3H3J9) were diluted because target analyte concentrations exceeded the calibration range.

Analyte	445441		
	001	004	005
Cyanide, Total	2X	5X	5X

Cyanide, Chlorinated

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Sample Dilutions

The following samples 1203986684 (B3H3P3DUP), 445441001 (B3H3P3), 445441004 (B3H3K2) and

445441005 (B3H3J9) were diluted because target analyte concentrations exceeded the calibration range.

Analyte	445441		
	001	004	005
Cyanide, Chlorinated	2X	5X	5X

Cyanide, Amenable to Chlorination

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Cyanide, Free

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Miscellaneous Information

Additional Comments

Total CN levels above the MDL for Free CN were detected in samples 445441001 (B3H3P3), 445441002 (B3H3P0), 445441004 (B3H3K2) and 445441005 (B3H3J9). Free CN was performed per SOP (GL-GC-E-073).

Alkalinity

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Chain of Custody and Supporting Documentation

CH2MHill Plateau Remediation Company		445441 CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		C.O.C.# W18-002-078				
				Page 1 of 1				
Collector: Juan Aguilar ICHPRC		Contact/Requester: Karen Waters-Husted		Telephone No.: 509-376-4650				
SAF No.: W18-002		Sampling Origin: Hanford Site		Purchase Order/Charge Code: 300071				
Project Title: RCRA, February 2018		Logbook No.: HNF-N-506 - 9917		Ice Chest No.: 605-534				
Shipped To (Lab): GEL Laboratories, LLC		Method of Shipment: Commercial Carrier		Bill of Lading/Air Bill No.: 771742795143				
Protocol: RCRA		Priority: 30 Days		Offsite Property No.: 9128				
POSSIBLE SAMPLE HAZARDS/REMARK ** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1				SPECIAL INSTRUCTIONS N/A				
Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3H3P3	Y	W	3-6-18	1420	1x500-mL aG	9014_CN (FREE): COMMON; 9012_CYANIDE (TOTAL): COMMON; 9012_CN (AMENABLE): COMMON	14 Days	NaOH to pH >=12 / Cool <=6C
B3H3P0	N	W	↓	↓	1x250-mL G/P	2320_ALKALINITY: GW 01	14 Days	Cool <=6C
B3H3P0	N	W	↓	↓	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2
B3H3P0	N	W	3-6-18	1420	1x500-mL aG	9014_CN (FREE): COMMON; 9012_CYANIDE (TOTAL): COMMON; 9012_CN (AMENABLE): COMMON	14 Days	NaOH to pH >=12 / Cool <=6C

Relinquished By: Juan Aguilar ICHPRC		MAR 06 2018 1440		Received By: SSU-1		MAR 06 2018 1440		Matrix * S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquid SO = Solid T = Tissue SL = Sludge WI = Wipe W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other	
Print First and Last Name		Signature		Print First and Last Name		Signature			
Date/Time		Date/Time		Date/Time		Date/Time			
Date/Time		Date/Time		Date/Time		Date/Time			
Relinquished By: SSU-1		MAR 07 2018 0914		Received By: Frank Hob ICHPRC		MAR 07 2018 0914			
Print First and Last Name		Signature		Print First and Last Name		Signature			
Date/Time		Date/Time		Date/Time		Date/Time			
Date/Time		Date/Time		Date/Time		Date/Time			
Relinquished By: Frank Hob ICHPRC		MAR 07 2018 1420		Received By: FEDEX					
Print First and Last Name		Signature		Print First and Last Name		Signature			
Date/Time		Date/Time		Date/Time		Date/Time			
Date/Time		Date/Time		Date/Time		Date/Time			
Relinquished By: Fed Ex		MAR 07 2018 1420		Received By: C. Carpin		3/8/18 0850			
Print First and Last Name		Signature		Print First and Last Name		Signature			
Date/Time		Date/Time		Date/Time		Date/Time			
Date/Time		Date/Time		Date/Time		Date/Time			
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process):				Disposed By:		Date/Time:	

CH2MHill Plateau Remediation Company		445441		86 162		C.O.C.# W18-002-081		
		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				Page 1 of 1		
Collector: Juan Aguilar ICHPRC		Contact/Requester: Karen Waters-Husted		Telephone No.: 509-376-4650				
SAF No.: W18-002		Sampling Origin: Hanford Site		Purchase Order/Charge Code: 300071				
Project Title: RCRA, February 2018		Logbook No.: HNF-N-506-9919		Ice Chest No.: GWS-682				
Shipped To (Lab): GEL Laboratories, LLC		Method of Shipment Commercial Carrier		Bill of Lading/Air Bill No.: 771745910057				
Protocol RCRA		Priority: 30 Days		Offsite Property No.: 9132				
POSSIBLE SAMPLE HAZARDS/REMARK ** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1				SPECIAL INSTRUCTIONS Low Volume Wells. Do not use for QC.				
Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3H3T0	N	W	3-7-18	1221	1x125-mL G/P	2320_ALKALINITY: GW 01	14 Days	Cool <=6C
B3H3T0	N	W	3-7-18	1221	1x125-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2

Relinquished By: Juan Aguilar ICHPRC	MAR 07 2018 1246	Received By: Daniel Klug CHPRC	MAR 07 2018 1240	Matrix * S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquid SO = Solid T = Tissue SL = Sludge WL = Wipe W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other	
Print First and Last Name	Signature	Date/Time	Date/Time		
Relinquished By: Troy Bacon CHPRC	MAR 07 2018 1400	Received By: FEDEX			
Print First and Last Name	Signature	Date/Time	Date/Time		
Relinquished By: Fed Ex		Received By: C. Tarpin	3/8/18		
Print First and Last Name	Signature	Date/Time	Date/Time		
Relinquished By:		Received By:			
Print First and Last Name	Signature	Date/Time	Date/Time		
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process):		Disposed By:	Date/Time:

CH2M Hill Plateau Remediation Company		445441 CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		C.O.C.# W18-002-082				
Collector: Juan Aguilar /CHPRC		Contact/Requester: Karen Waters-Husted		Telephone No.: 509-376-4650				
SAF No.: W18-002		Sampling Origin: Hanford Site		Purchase Order/Charge Code: 300071				
Project Title: RCRA, February 2018		Logbook No.: HNF-N-506-9917		Ice Chest No.: GWS-534				
Shipped To (Lab): GEL Laboratories, LLC		Method of Shipment: Commercial Carrier		Bill of Lading/Air Bill No.: 771742795143				
Protocol: RCRA		Priority: 30 Days		Offsite Property No.: 9128				
POSSIBLE SAMPLE HAZARDS/REMARK ** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1			SPECIAL INSTRUCTIONS Low Volume Wells. Do not use for QC.					
Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3H3K2	Y	W	3-6-18	1244	1x500-mL aG	9014_CN (FREE): COMMON; 9012_CYANIDE (TOTAL): COMMON; 9012_CN (AMENABLE): COMMON	14 Days	NaOH to pH ≥12 / Cool ≤6C
B3H3J9	N	W	3-6-18	1244	1x125-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2
B3H3J9	N	W	3-6-18	1244	1x500-mL aG	9014_CN (FREE): COMMON; 9012_CYANIDE (TOTAL): COMMON; 9012_CN (AMENABLE): COMMON	14 Days	NaOH to pH ≥12 / Cool ≤6C

APRIL 4, 2018

Relinquished By: Juan Aguilar /CHPRC Print First and Last Name Signature Date/Time MAR 06 2018 1440			Received By: SSU #1 Print First and Last Name Signature Date/Time MAR 06 2018 1440			Matrix * S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquid SO = Solid T = Tissue SL = Sludge WI = Wipe W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other		
Relinquished By: SSU-1 Print First and Last Name Signature Date/Time MAR 07 2018			Received By: Frank Hui /CHPRC Print First and Last Name Signature Date/Time MAR 07 2018					
Relinquished By: Frank Hui /CHPRC Print First and Last Name Signature Date/Time MAR 07 2018			Received By: FEDEX Print First and Last Name Signature Date/Time					
Relinquished By: Fed Ex Print First and Last Name Signature Date/Time			Received By: C. Tarpin Print First and Last Name Signature Date/Time 3/8/18					
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process):				Disposed By:		Date/Time:

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CH2MHill Plateau Remediation Company		445441 CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		C.O.C. # W18-002-084				
				Page 1 of 1				
Collector: Juan Aguilar CHPRC		Contact/Requester: Karen Waters-Husted		Telephone No.: 509-376-4650				
SAF No.: W18-002		Sampling Origin: Hanford Site		Purchase Order/Charge Code: 300071				
Project Title: RCRA, February 2018		Logbook No.: HNF-N-506 - 99/9		Ice Chest No.: GWS-682				
Shipped To (Lab): GEL Laboratories, LLC		Method of Shipment: Commercial Carrier		Bill of Lading/Air Bill No.: 771745910057				
Protocol: RCRA		Priority: 30 Days		Offsite Property No.: 9132				
POSSIBLE SAMPLE HAZARDS/REMARK ** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1			SPECIAL INSTRUCTIONS Low Volume Wells. Do not use for QC.					
Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3H3L8	N	W	3-7-18	0825	1x125-mL G/P	2320_ALKALINITY: GW 01	14 Days	Cool <=6C
B3H3L8	N	W	3-7-18	0825	1x125-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2

Relinquished By: Juan Aguilar CHPRC Print First and Last Name Signature Date/Time			Received By: Daniel Klug CHPRC Print First and Last Name Signature Date/Time			Matrix * S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquid SO = Solid T = Tissue SL = Sludge WI = Wipe W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other		
Relinquished By: Troy Bacon CHPRC Print First and Last Name Signature Date/Time			Received By: FEDEX Print First and Last Name Signature Date/Time					
Relinquished By: Fed Ex Print First and Last Name Signature Date/Time			Received By: C. Tarpin Print First and Last Name Signature Date/Time					
Relinquished By: Print First and Last Name Signature Date/Time			Received By: Print First and Last Name Signature Date/Time					
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process):				Disposed By:		Date/Time:

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>445441</u>		HS	
Received By: <u>Chakeris Tarplin</u>		Date Received: <u>March 08, 2018</u>			
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <u>771744210691</u> <u>771745910057</u> <u>771742795143</u>			
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.			
Shipped as a DOT Hazardous?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____			
COC/Samples marked or classified as radioactive?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> (CPM)/mR/Hr Classified as: <u>Rad 1</u> Rad 2 Rad 3			
Is package, COC, and/or Samples marked HAZ?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other: _____			
Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <u>Wet Ice</u> Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius
4	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>IR4-17</u> Secondary Temperature Device Serial # (If Applicable): _____
5	Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's and Containers Affected: If Preservation added, Lot#: _____
7	Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>			If Yes, Are Encores or Soil Kits present? Yes _____ No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No _____ N/A _____ (If unknown, select No) VOA vials free of headspace? Yes <input checked="" type="checkbox"/> No _____ N/A _____ Sample ID's and containers affected: _____
8	Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected: _____
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected: _____
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected: _____
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected: _____
12	Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
Comments (Use Continuation Form if needed):					

PM (or PMA) review: Initials AD Date 3/9/18 Page 1 of 1

GL-CHL-SR-001 Rev 5

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

Qualifier	Qualifier Definition	Department	Fraction
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.		
J	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated	Organics	
P	Aroclor target analyte with greater than 25% difference between column analyses.	Organics	
C	Analyte has been confirmed by GC/MS analysis	Organics	Pesticide
B	The analyte was detected in both the associated QC blank and in the sample.	Organics	
E	Concentration exceeds the calibration range of the instrument	Organics	
A	The TIC is a suspected aldol-condensation product	Organics	Semi-Volatile
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
N	Spike Sample recovery is outside control limits.		
*	Duplicate analysis not within control limits	Inorganics	
>	Result greater than quantifiable range or greater than upper limit of the analysis range	General Chemistry	
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	Inorganics	Metals
D	Results are reported from a diluted aliquot of sample.		
E	Reported value is estimated due to interferences. See comment in narrative.	Inorganics	Metals
M	Duplicate precision not met.	Inorganics	Metals
o	Analyte failed to recover within LCS limits (Organics only)	Organics	
S	Reported value determined by the Method of Standard Additions (MSA)	Inorganics	
T	Spike and/or spike duplicate sample recovery is outside control limits.	Organics	
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.	Inorganics	
B	The analyte was detected in the associated method blank \geq MDC or $>5\%$ sample activity.	Radiological	
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
+	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995	Inorganics	
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	General Chemistry	
C	Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is $> 5\%$ of the measured concentration and/or decision level for associated samples.	Inorganics	Metals
C	Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is $> 5\%$ of the measured concentration and/or decision level for associated samples.	General Chemistry	
<	Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide	General Chemistry	
UX	Gamma Spectroscopy--Uncertain identification	Radiological	

Laboratory Certifications

List of current GEL Certifications as of 29 March 2018

State	Certification
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA180011
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122018-26
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL445441
Work Order #: 445441

Product: Determination of Metals by ICP**Analytical Method:** SW846 3005A/6010D**Analytical Procedure:** GL-MA-E-013 REV# 30**Analytical Batch:** 1745497**Product: Determination of Metals by ICP-MS****Analytical Method:** SW846 3005A/6020B**Analytical Procedure:** GL-MA-E-014 REV# 32**Analytical Batches:** 1745491 and 1748724**Preparation Method:** SW846 3005A**Preparation Procedure:** GL-MA-E-006 REV# 14**Preparation Batches:** 1745490, 1745496 and 1748719

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445441002	B3H3P0
445441003	B3H3T0
445441005	B3H3J9
445441006	B3H3L8
1203986126	Method Blank (MB) ICP
1203986127	Laboratory Control Sample (LCS)
1203986130	445432003(NonSDGL) Serial Dilution (SD)
1203986128	445432003(NonSDGS) Matrix Spike (MS)
1203986129	445432003(NonSDGSD) Matrix Spike Duplicate (MSD)
1203986116	Method Blank (MB) ICP-MS
1203993119	Method Blank (MB) ICP-MS
1203986117	Laboratory Control Sample (LCS)
1203993120	Laboratory Control Sample (LCS)
1203986120	445432003(NonSDGL) Serial Dilution (SD)
1203993123	445432003(NonSDGL) Serial Dilution (SD)
1203986118	445432003(NonSDGS) Matrix Spike (MS)
1203993121	445432003(NonSDGS) Matrix Spike (MS)
1203986119	445432003(NonSDGSD) Matrix Spike Duplicate (MSD)
1203993122	445432003(NonSDGSD) Matrix Spike Duplicate (MSD)
1203993699	445432003(NonSDGPS) Post Spike (PS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Calibration Information**ICSA/ICSAB Statement**

For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

Quality Control (QC) Information**Method Blank (MB) Statement**

The method blanks (MB) analyzed with this SDG met the acceptance criteria. However, where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

Sample	Analyte	Value
1203986116 (MB)	Molybdenum	0.204 between (0.2 - 0.25)
	Tin	1.36 between (1 - 2.5)
1203986126 (MB)	Potassium	54.4 between (50 - 75)

Matrix Spike (MS/MSD) Recovery Statement

The percent recoveries (%R) obtained from the MS/MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analyte. The post spike recovery was within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recovery may be attributed to possible sample matrix interference and/or non-homogeneity.

Sample	Analyte	Value
1203993121 (Non SDG 445432003MS)	Zinc	74* (75%-125%)

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL445441 GEL Work Order: 445441

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is $> 5\%$ of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature:**Name: Nik-Cole Elmore****Date: 04 APR 2018****Title: Data Validator**

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL445441

CONTRACT: CPRCOW18002

METHOD TYPE: SW846

SAMPLE ID: 445441002

BASIS: As Received

DATE COLLECTED 06-MAR-18

CLIENT ID: B3H3P0

LEVEL: Low

DATE RECEIVED 08-MAR-18

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	19.3	ug/L	U	19.3	50	50	1	MS	BAJ	03/19/18 18:03	180319-2	1745491
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	03/19/18 21:49	180319-3	1745491
7440-38-2	Arsenic	3.18	ug/L	B	2	5	5	1	MS	BAJ	03/19/18 18:03	180319-2	1745491
7440-39-3	Barium	78	ug/L		0.67	2	2	1	MS	BAJ	03/19/18 18:03	180319-2	1745491
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	BAJ	03/19/18 18:03	180319-2	1745491
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	03/15/18 12:45	031518-1	1745497
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/19/18 18:03	180319-2	1745491
7440-70-2	Calcium	74700	ug/L		50	200	200	1	P	HSC	03/15/18 12:45	031518-1	1745497
7440-47-3	Chromium	40.3	ug/L		3	10	10	1	MS	BAJ	03/19/18 18:03	180319-2	1745491
7440-48-4	Cobalt	0.676	ug/L	B	0.3	1	1	1	MS	BAJ	03/19/18 18:03	180319-2	1745491
7440-50-8	Copper	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/19/18 18:03	180319-2	1745491
7439-89-6	Iron	102	ug/L		30	100	100	1	P	HSC	03/15/18 12:45	031518-1	1745497
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	03/19/18 18:03	180319-2	1745491
7439-95-4	Magnesium	24800	ug/L		110	300	300	1	P	HSC	03/15/18 12:45	031518-1	1745497
7439-96-5	Manganese	1	ug/L	U	1	5	5	1	MS	BAJ	03/19/18 18:03	180319-2	1745491
7439-98-7	Molybdenum	4.33	ug/L		0.2	0.5	0.5	1	MS	BAJ	03/19/18 18:03	180319-2	1745491
7440-02-0	Nickel	0.848	ug/L	B	0.6	2	2	1	MS	BAJ	03/19/18 18:03	180319-2	1745491
7440-09-7	Potassium	5560	ug/L		50	150	150	1	P	HSC	03/15/18 12:45	031518-1	1745497
7782-49-2	Selenium	3.72	ug/L	B	2	5	5	1	MS	BAJ	03/19/18 18:03	180319-2	1745491
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/19/18 18:03	180319-2	1745491
7440-23-5	Sodium	39400	ug/L		100	300	300	1	P	HSC	03/15/18 12:45	031518-1	1745497
7440-24-6	Strontium	344	ug/L		2	10	10	1	MS	BAJ	03/19/18 18:03	180319-2	1745491
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	03/19/18 18:03	180319-2	1745491
7440-29-1	Thorium	0.70	ug/L	U	0.7	2	2	1	MS	BAJ	03/19/18 18:03	180319-2	1745491
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	BAJ	03/19/18 18:03	180319-2	1745491
7440-61-1	Uranium	2.06	ug/L		0.067	0.2	0.2	1	MS	BAJ	03/19/18 18:03	180319-2	1745491
7440-62-2	Vanadium	21.7	ug/L		1	5	5	1	P	HSC	03/15/18 12:45	031518-1	1745497
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	MS	SKJ	03/21/18 13:38	180321-4	1748724

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1745491	1745490	SW846 3005A	50	mL	50	mL	03/08/18	JXM8
1745497	1745496	SW846 3005A	50	mL	50	mL	03/08/18	JXM8
1748724	1748719	SW846 3005A	25	mL	25	mL	03/20/18	JXM8

METALS

-1-

INORGANICS ANALYSIS DATA PACKAGE

***Analytical Methods:**

P	SW846 3005A/6010D
MS	SW846 3005A/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL445441

CONTRACT: CPRCOW18002

METHOD TYPE: SW846

SAMPLE ID: 445441003

BASIS: As Received

DATE COLLECTED 07-MAR-18

CLIENT ID: B3H3T0

LEVEL: Low

DATE RECEIVED 08-MAR-18

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	207	ug/L		19.3	50	50	1	MS	BAJ	03/19/18 18:06	180319-2	1745491
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	03/19/18 21:52	180319-3	1745491
7440-38-2	Arsenic	2.48	ug/L	B	2	5	5	1	MS	BAJ	03/19/18 18:06	180319-2	1745491
7440-39-3	Barium	138	ug/L		0.67	2	2	1	MS	BAJ	03/19/18 18:06	180319-2	1745491
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	BAJ	03/19/18 18:06	180319-2	1745491
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	03/15/18 12:48	031518-1	1745497
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/19/18 18:06	180319-2	1745491
7440-70-2	Calcium	142000	ug/L		50	200	200	1	P	HSC	03/15/18 12:48	031518-1	1745497
7440-47-3	Chromium	188	ug/L		3	10	10	1	MS	BAJ	03/19/18 18:06	180319-2	1745491
7440-48-4	Cobalt	0.606	ug/L	B	0.3	1	1	1	MS	BAJ	03/19/18 18:06	180319-2	1745491
7440-50-8	Copper	1.63	ug/L		0.3	1	1	1	MS	BAJ	03/19/18 18:06	180319-2	1745491
7439-89-6	Iron	1420	ug/L		30	100	100	1	P	HSC	03/15/18 12:48	031518-1	1745497
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	03/19/18 18:06	180319-2	1745491
7439-95-4	Magnesium	47300	ug/L		110	300	300	1	P	HSC	03/15/18 12:48	031518-1	1745497
7439-96-5	Manganese	10.6	ug/L		1	5	5	1	MS	BAJ	03/19/18 18:06	180319-2	1745491
7439-98-7	Molybdenum	3.4	ug/L	C	0.2	0.5	0.5	1	MS	BAJ	03/19/18 18:06	180319-2	1745491
7440-02-0	Nickel	22.6	ug/L		0.6	2	2	1	MS	BAJ	03/19/18 18:06	180319-2	1745491
7440-09-7	Potassium	7830	ug/L		50	150	150	1	P	HSC	03/15/18 12:48	031518-1	1745497
7782-49-2	Selenium	3.91	ug/L	B	2	5	5	1	MS	BAJ	03/19/18 18:06	180319-2	1745491
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/19/18 18:06	180319-2	1745491
7440-23-5	Sodium	38300	ug/L		100	300	300	1	P	HSC	03/15/18 12:48	031518-1	1745497
7440-24-6	Strontium	587	ug/L		2	10	10	1	MS	BAJ	03/19/18 18:06	180319-2	1745491
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	03/19/18 18:06	180319-2	1745491
7440-29-1	Thorium	0.70	ug/L	U	0.7	2	2	1	MS	BAJ	03/19/18 18:06	180319-2	1745491
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	BAJ	03/19/18 18:06	180319-2	1745491
7440-61-1	Uranium	2.27	ug/L		0.067	0.2	0.2	1	MS	BAJ	03/19/18 18:06	180319-2	1745491
7440-62-2	Vanadium	18.9	ug/L		1	5	5	1	P	HSC	03/15/18 12:48	031518-1	1745497
7440-66-6	Zinc	43.7	ug/L		3.3	10	10	1	MS	SKJ	03/21/18 13:43	180321-4	1748724

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1745491	1745490	SW846 3005A	50	mL	50	mL	03/08/18	JXM8
1745497	1745496	SW846 3005A	50	mL	50	mL	03/08/18	JXM8
1748724	1748719	SW846 3005A	25	mL	25	mL	03/20/18	JXM8

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

***Analytical Methods:**

P	SW846 3005A/6010D
MS	SW846 3005A/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL445441

CONTRACT: CPRCOW18002

METHOD TYPE: SW846

SAMPLE ID: 445441005

BASIS: As Received

DATE COLLECTED 06-MAR-18

CLIENT ID: B3H3J9

LEVEL: Low

DATE RECEIVED 08-MAR-18

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	490	ug/L		19.3	50	50	1	MS	BAJ	03/19/18 18:09	180319-2	1745491
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	03/19/18 21:56	180319-3	1745491
7440-38-2	Arsenic	3.16	ug/L	B	2	5	5	1	MS	BAJ	03/19/18 18:09	180319-2	1745491
7440-39-3	Barium	97.6	ug/L		0.67	2	2	1	MS	BAJ	03/19/18 18:09	180319-2	1745491
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	BAJ	03/19/18 18:09	180319-2	1745491
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	03/15/18 12:50	031518-1	1745497
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/19/18 18:09	180319-2	1745491
7440-70-2	Calcium	92300	ug/L		50	200	200	1	P	HSC	03/15/18 12:50	031518-1	1745497
7440-47-3	Chromium	30.5	ug/L		3	10	10	1	MS	BAJ	03/19/18 18:09	180319-2	1745491
7440-48-4	Cobalt	1.4	ug/L		0.3	1	1	1	MS	BAJ	03/19/18 18:09	180319-2	1745491
7440-50-8	Copper	1.98	ug/L		0.3	1	1	1	MS	BAJ	03/19/18 18:09	180319-2	1745491
7439-89-6	Iron	1620	ug/L		30	100	100	1	P	HSC	03/15/18 12:50	031518-1	1745497
7439-92-1	Lead	0.596	ug/L	B	0.5	2	2	1	MS	BAJ	03/19/18 18:09	180319-2	1745491
7439-95-4	Magnesium	33000	ug/L		110	300	300	1	P	HSC	03/15/18 12:50	031518-1	1745497
7439-96-5	Manganese	17	ug/L		1	5	5	1	MS	BAJ	03/19/18 18:09	180319-2	1745491
7439-98-7	Molybdenum	2.6	ug/L	C	0.2	0.5	0.5	1	MS	BAJ	03/19/18 18:09	180319-2	1745491
7440-02-0	Nickel	3.74	ug/L		0.6	2	2	1	MS	BAJ	03/19/18 18:09	180319-2	1745491
7440-09-7	Potassium	6270	ug/L		50	150	150	1	P	HSC	03/15/18 12:50	031518-1	1745497
7782-49-2	Selenium	8.14	ug/L		2	5	5	1	MS	BAJ	03/19/18 18:09	180319-2	1745491
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/19/18 18:09	180319-2	1745491
7440-23-5	Sodium	32400	ug/L		100	300	300	1	P	HSC	03/15/18 12:50	031518-1	1745497
7440-24-6	Strontium	420	ug/L		2	10	10	1	MS	BAJ	03/19/18 18:09	180319-2	1745491
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	03/19/18 18:09	180319-2	1745491
7440-29-1	Thorium	0.70	ug/L	U	0.7	2	2	1	MS	BAJ	03/19/18 18:09	180319-2	1745491
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	BAJ	03/19/18 18:09	180319-2	1745491
7440-61-1	Uranium	1.86	ug/L		0.067	0.2	0.2	1	MS	BAJ	03/19/18 18:09	180319-2	1745491
7440-62-2	Vanadium	18.9	ug/L		1	5	5	1	P	HSC	03/15/18 12:50	031518-1	1745497
7440-66-6	Zinc	61.3	ug/L		3.3	10	10	1	MS	SKJ	03/21/18 13:44	180321-4	1748724

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1745491	1745490	SW846 3005A	50	mL	50	mL	03/08/18	JXM8
1745497	1745496	SW846 3005A	50	mL	50	mL	03/08/18	JXM8
1748724	1748719	SW846 3005A	25	mL	25	mL	03/20/18	JXM8

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

***Analytical Methods:**

P	SW846 3005A/6010D
MS	SW846 3005A/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL445441

CONTRACT: CPCR0W18002

METHOD TYPE: SW846

SAMPLE ID: 445441006

BASIS: As Received

DATE COLLECTED 07-MAR-18

CLIENT ID: B3H3L8

LEVEL: Low

DATE RECEIVED 08-MAR-18

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	19.3	ug/L	U	19.3	50	50	1	MS	BAJ	03/19/18 18:12	180319-2	1745491
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	03/19/18 21:59	180319-3	1745491
7440-38-2	Arsenic	3.1	ug/L	B	2	5	5	1	MS	BAJ	03/19/18 18:12	180319-2	1745491
7440-39-3	Barium	46.5	ug/L		0.67	2	2	1	MS	BAJ	03/19/18 18:12	180319-2	1745491
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	BAJ	03/19/18 18:12	180319-2	1745491
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	03/15/18 12:52	031518-1	1745497
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/19/18 18:12	180319-2	1745491
7440-70-2	Calcium	55500	ug/L		50	200	200	1	P	HSC	03/15/18 12:52	031518-1	1745497
7440-47-3	Chromium	7.86	ug/L	B	3	10	10	1	MS	BAJ	03/19/18 18:12	180319-2	1745491
7440-48-4	Cobalt	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/19/18 18:12	180319-2	1745491
7440-50-8	Copper	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/19/18 18:12	180319-2	1745491
7439-89-6	Iron	99.4	ug/L	B	30	100	100	1	P	HSC	03/15/18 12:52	031518-1	1745497
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	03/19/18 18:12	180319-2	1745491
7439-95-4	Magnesium	18300	ug/L		110	300	300	1	P	HSC	03/15/18 12:52	031518-1	1745497
7439-96-5	Manganese	1	ug/L	U	1	5	5	1	MS	BAJ	03/19/18 18:12	180319-2	1745491
7439-98-7	Molybdenum	4.06	ug/L	C	0.2	0.5	0.5	1	MS	BAJ	03/19/18 18:12	180319-2	1745491
7440-02-0	Nickel	0.670	ug/L	B	0.6	2	2	1	MS	BAJ	03/19/18 18:12	180319-2	1745491
7440-09-7	Potassium	4540	ug/L		50	150	150	1	P	HSC	03/15/18 12:52	031518-1	1745497
7782-49-2	Selenium	2.65	ug/L	B	2	5	5	1	MS	BAJ	03/19/18 18:12	180319-2	1745491
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/19/18 18:12	180319-2	1745491
7440-23-5	Sodium	13500	ug/L		100	300	300	1	P	HSC	03/15/18 12:52	031518-1	1745497
7440-24-6	Strontium	225	ug/L		2	10	10	1	MS	BAJ	03/19/18 18:12	180319-2	1745491
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	03/19/18 18:12	180319-2	1745491
7440-29-1	Thorium	0.70	ug/L	U	0.7	2	2	1	MS	BAJ	03/19/18 18:12	180319-2	1745491
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	BAJ	03/19/18 18:12	180319-2	1745491
7440-61-1	Uranium	1.36	ug/L		0.067	0.2	0.2	1	MS	BAJ	03/19/18 18:12	180319-2	1745491
7440-62-2	Vanadium	23.8	ug/L		1	5	5	1	P	HSC	03/15/18 12:52	031518-1	1745497
7440-66-6	Zinc	5.98	ug/L	B	3.3	10	10	1	MS	SKJ	03/21/18 13:46	180321-4	1748724

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1745491	1745490	SW846 3005A	50	mL	50	mL	03/08/18	JXM8
1745497	1745496	SW846 3005A	50	mL	50	mL	03/08/18	JXM8
1748724	1748719	SW846 3005A	25	mL	25	mL	03/20/18	JXM8

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

***Analytical Methods:**

P	SW846 3005A/6010D
MS	SW846 3005A/6020B

Quality Control Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary**Report Date: April 4, 2018****Page 1 of 11****CH2MHill Plateau Remediation Company****MSIN R3-50 CHPRC****PO Box 1600****Richland, Washington****Contact: Mr. Scot Fitzgerald****Workorder: 445441**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1745491										
QC1203986117	LCS										
Aluminum	2000			2060	ug/L		103	(80%-120%)	BAJ	03/19/18	17:26
Antimony	50.0			48.9	ug/L		97.7	(80%-120%)		03/19/18	21:13
Arsenic	50.0			51.3	ug/L		103	(80%-120%)		03/19/18	17:26
Barium	50.0			48.6	ug/L		97.2	(80%-120%)			
Beryllium	50.0			56.4	ug/L		113	(80%-120%)			
Cadmium	50.0			50.3	ug/L		101	(80%-120%)			
Chromium	50.0			50.0	ug/L		100	(80%-120%)			
Cobalt	50.0			49.4	ug/L		98.8	(80%-120%)			
Copper	50.0			51.1	ug/L		102	(80%-120%)			
Lead	50.0			49.2	ug/L		98.3	(80%-120%)			
Manganese	50.0			49.0	ug/L		98	(80%-120%)			
Molybdenum	50.0			51.6	ug/L		103	(80%-120%)			
Nickel	50.0			51.7	ug/L		103	(80%-120%)			

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QC Summary**Workorder: 445441****Page 2 of 11**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1745491										
Selenium	50.0			49.7	ug/L		99.4	(80%-120%)	BAJ	03/19/18	17:26
Silver	50.0			51.3	ug/L		103	(80%-120%)			
Strontium	50.0			50.2	ug/L		100	(80%-120%)			
Thallium	50.0			44.1	ug/L		88.3	(80%-120%)			
Thorium	50.0			45.3	ug/L		90.6	(80%-120%)			
Tin	50.0			50.9	ug/L		102	(80%-120%)			
Uranium	50.0			46.5	ug/L		93.1	(80%-120%)			
QC1203986116	MB										
Aluminum			U	19.3	ug/L					03/19/18	17:23
Antimony			U	1.00	ug/L					03/19/18	21:10
Arsenic			U	2.00	ug/L					03/19/18	17:23
Barium			U	0.670	ug/L						
Beryllium			U	0.200	ug/L						
Cadmium			U	0.300	ug/L						
Chromium			U	3.00	ug/L						
Cobalt			U	0.300	ug/L						

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QC Summary**Workorder: 445441****Page 3 of 11**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1745491										
Copper			U	0.300	ug/L				BAJ	03/19/18	17:23
Lead			U	0.500	ug/L						
Manganese			U	1.00	ug/L						
Molybdenum			B	0.204	ug/L						
Nickel			U	0.600	ug/L						
Selenium			U	2.00	ug/L						
Silver			U	0.300	ug/L						
Strontium			U	2.00	ug/L						
Thallium			U	0.600	ug/L						
Thorium			U	0.700	ug/L						
Tin			B	1.36	ug/L						
Uranium			U	0.067	ug/L						
QC1203986118 445432003 MS											
Aluminum	2000	U	19.3	1990	ug/L		99.3	(75%-125%)		03/19/18	17:33
Antimony	50.0	U	1.00	48.9	ug/L		97.2	(75%-125%)		03/19/18	21:20
Arsenic	50.0	U	2.00	52.5	ug/L		102	(75%-125%)		03/19/18	17:33

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QC Summary**Workorder: 445441****Page 4 of 11**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS												
Batch	1745491											
Barium	50.0	U	0.670		49.1	ug/L		98.1	(75%-125%)	BAJ	03/19/18	17:33
Beryllium	50.0	U	0.200		56.5	ug/L		113	(75%-125%)			
Cadmium	50.0	U	0.300		50.0	ug/L		100	(75%-125%)			
Chromium	50.0	U	3.00		49.4	ug/L		96.8	(75%-125%)			
Cobalt	50.0	U	0.300		51.1	ug/L		102	(75%-125%)			
Copper	50.0	U	0.300		51.2	ug/L		102	(75%-125%)			
Lead	50.0	U	0.500		49.3	ug/L		98.5	(75%-125%)			
Manganese	50.0	U	1.00		49.6	ug/L		98.9	(75%-125%)			
Molybdenum	50.0	U	0.200		51.1	ug/L		102	(75%-125%)			
Nickel	50.0	U	0.600		52.1	ug/L		103	(75%-125%)			
Selenium	50.0	U	2.00		51.4	ug/L		103	(75%-125%)			
Silver	50.0	U	0.300		52.3	ug/L		105	(75%-125%)			
Strontium	50.0	U	2.00		49.1	ug/L		98.1	(75%-125%)			
Thallium	50.0	U	0.600		45.9	ug/L		91.7	(75%-125%)			
Thorium	50.0	U	0.700		46.1	ug/L		91.8	(75%-125%)			

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QC Summary**Workorder: 445441****Page 5 of 11**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS												
Batch	1745491											
Tin	50.0	U	1.00		50.1	ug/L		99.7	(75%-125%)	BAJ	03/19/18	17:33
Uranium	50.0	U	0.067		47.5	ug/L		94.9	(75%-125%)			
QC1203986119 445432003 MSD												
Aluminum	2000	U	19.3		2240	ug/L	11.7	112	(0%-20%)		03/19/18	17:36
Antimony	50.0	U	1.00		47.5	ug/L	2.9	94.4	(0%-20%)		03/19/18	21:23
Arsenic	50.0	U	2.00		54.9	ug/L	4.39	107	(0%-20%)		03/19/18	17:36
Barium	50.0	U	0.670		51.5	ug/L	4.82	103	(0%-20%)			
Beryllium	50.0	U	0.200		61.3	ug/L	8.07	123	(0%-20%)			
Cadmium	50.0	U	0.300		52.5	ug/L	4.89	105	(0%-20%)			
Chromium	50.0	U	3.00		54.8	ug/L	10.4	108	(0%-20%)			
Cobalt	50.0	U	0.300		54.3	ug/L	6.08	108	(0%-20%)			
Copper	50.0	U	0.300		56.4	ug/L	9.57	113	(0%-20%)			
Lead	50.0	U	0.500		52.3	ug/L	6.03	105	(0%-20%)			
Manganese	50.0	U	1.00		55.0	ug/L	10.3	110	(0%-20%)			
Molybdenum	50.0	U	0.200		49.2	ug/L	3.77	98	(0%-20%)			
Nickel	50.0	U	0.600		57.0	ug/L	9	113	(0%-20%)			

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QC Summary**Workorder: 445441****Page 6 of 11**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1745491										
Selenium	50.0	U	2.00	55.1	ug/L	6.89	110	(0%-20%)	BAJ	03/19/18	17:36
Silver	50.0	U	0.300	55.0	ug/L	5.07	110	(0%-20%)			
Strontium	50.0	U	2.00	53.0	ug/L	7.63	106	(0%-20%)			
Thallium	50.0	U	0.600	49.1	ug/L	6.83	98.1	(0%-20%)			
Thorium	50.0	U	0.700	49.6	ug/L	7.27	98.8	(0%-20%)			
Tin	50.0	U	1.00	47.1	ug/L	6.02	93.8	(0%-20%)			
Uranium	50.0	U	0.067	50.2	ug/L	5.6	100	(0%-20%)			
QC1203986120 445432003 SDILT											
Aluminum		U	4.16 DU	96.5	ug/L	N/A		(0%-20%)		03/19/18	17:43
Antimony		U	0.258 DU	5.00	ug/L	N/A		(0%-20%)		03/19/18	21:29
Arsenic		U	1.46 DU	10.0	ug/L	N/A		(0%-20%)		03/19/18	17:43
Barium		U	0.087 DU	3.35	ug/L	N/A		(0%-20%)			
Beryllium		U	0.009 DU	1.00	ug/L	N/A		(0%-20%)			
Cadmium		U	0.002 DU	1.50	ug/L	N/A		(0%-20%)			
Chromium		U	0.987 DU	15.0	ug/L	N/A		(0%-20%)			
Cobalt		U	0.021 DU	1.50	ug/L	N/A		(0%-20%)			

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QC Summary**Workorder: 445441****Page 7 of 11**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1745491										
Copper	U	0.057	DU	1.50	ug/L	N/A		(0%-20%)	BAJ	03/19/18	17:43
Lead	U	0.015	DU	2.50	ug/L	N/A		(0%-20%)			
Manganese	U	0.122	DU	5.00	ug/L	N/A		(0%-20%)			
Molybdenum	U	0.169	DU	1.00	ug/L	N/A		(0%-20%)			
Nickel	U	0.484	DU	3.00	ug/L	N/A		(0%-20%)			
Selenium	U	-0.019	DU	10.0	ug/L	N/A		(0%-20%)			
Silver	U	0.003	DU	1.50	ug/L	N/A		(0%-20%)			
Strontium	U	0.026	DU	10.0	ug/L	N/A		(0%-20%)			
Thallium	U	0.044	DU	3.00	ug/L	N/A		(0%-20%)			
Thorium	U	0.214	DU	3.50	ug/L	N/A		(0%-20%)			
Tin	U	0.213	DU	5.00	ug/L	N/A		(0%-20%)			
Uranium	U	0.025	DU	0.335	ug/L	N/A		(0%-20%)			
<hr/>											
Batch	1748724										
QC1203993120	LCS										
Zinc	50.0			56.6	ug/L		113	(80%-120%)	SKJ	03/21/18	13:21
QC1203993119	MB										
Zinc		U		3.30	ug/L					03/21/18	13:20

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QC Summary**Workorder: 445441****Page 8 of 11**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1748724										
QC1203993121	445432003	MS									
Zinc	50.0	N	15.4	N	52.4	ug/L	74 *	(75%-125%)	SKJ	03/21/18	13:24
QC1203993122	445432003	MSD									
Zinc	50.0	N	15.4		60.8	ug/L	14.9	90.9	(0%-20%)	03/21/18	13:26
QC1203993699	445432003	PS									
Zinc	50.0	N	15.4		64.7	ug/L		98.6	(75%-125%)	03/21/18	13:27
QC1203993123	445432003	SDILT									
Zinc		N	15.4	BD	4.56	ug/L	48.1	(0%-20%)		03/21/18	13:29
Metals Analysis-ICP											
Batch	1745497										
QC1203986127	LCS										
Boron	500				490	ug/L	98	(80%-120%)	HSC	03/15/18	12:19
Calcium	5000				4900	ug/L	98.1	(80%-120%)			
Iron	5000				4770	ug/L	95.4	(80%-120%)			
Magnesium	5000				4820	ug/L	96.4	(80%-120%)			
Potassium	5000				4680	ug/L	93.6	(80%-120%)			
Sodium	5000				4830	ug/L	96.6	(80%-120%)			
Vanadium	500				487	ug/L	97.3	(80%-120%)			
QC1203986126	MB										
Boron			U		15.0	ug/L				03/15/18	12:16
Calcium			U		50.0	ug/L					

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QC Summary**Workorder: 445441****Page 9 of 11**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1745497										
Iron			U	30.0	ug/L				HSC	03/15/18	12:16
Magnesium			U	110	ug/L						
Potassium			B	54.4	ug/L						
Sodium			U	100	ug/L						
Vanadium			U	1.00	ug/L						
QC1203986128 445432003 MS											
Boron	500	U	15.0	493	ug/L		98.4	(75%-125%)		03/15/18	12:24
Calcium	5000	U	50.0	4990	ug/L		99.6	(75%-125%)			
Iron	5000	U	30.0	4940	ug/L		98.6	(75%-125%)			
Magnesium	5000	U	110	4990	ug/L		99.8	(75%-125%)			
Potassium	5000	BC	50.2	4740	ug/L		93.9	(75%-125%)			
Sodium	5000	U	100	4930	ug/L		97.8	(75%-125%)			
Vanadium	500	U	1.00	487	ug/L		97.4	(75%-125%)			
QC1203986129 445432003 MSD											
Boron	500	U	15.0	496	ug/L	0.593	99	(0%-20%)		03/15/18	12:26
Calcium	5000	U	50.0	4950	ug/L	0.883	98.7	(0%-20%)			
Iron	5000	U	30.0	4890	ug/L	1.04	97.5	(0%-20%)			

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QC Summary**Workorder: 445441****Page 10 of 11**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1745497										
Magnesium	5000	U	110	4960	ug/L	0.687	99.2	(0%-20%)	HSC	03/15/18	12:26
Potassium	5000	BC	50.2	4720	ug/L	0.509	93.4	(0%-20%)			
Sodium	5000	U	100	4890	ug/L	0.782	97.1	(0%-20%)			
Vanadium	500	U	1.00	492	ug/L	0.942	98.3	(0%-20%)			
QC1203986130 445432003 SDILT											
Boron		U	0.642	DU	75.0	ug/L	N/A	(0%-20%)		03/15/18	12:28
Calcium		U	15.4	DU	250	ug/L	N/A	(0%-20%)			
Iron		U	11.3	DU	150	ug/L	N/A	(0%-20%)			
Magnesium		U	0.0399	DU	550	ug/L	N/A	(0%-20%)			
Potassium		BC	50.2	DU	250	ug/L	N/A	(0%-20%)			
Sodium		U	40.1	DU	500	ug/L	N/A	(0%-20%)			
Vanadium		U	0.113	DU	5.00	ug/L	N/A	(0%-20%)			

Notes:

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- E Reported value is estimated due to interferences. See comment in narrative.

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QC Summary

Workorder: 445441

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
M	Duplicate precision not met.										
N	Spike Sample recovery is outside control limits.										
S	Reported value determined by the Method of Standard Additions (MSA)										
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.										
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

General Chem Analysis

Case Narrative

**General Chemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL445441
Work Order #: 445441**

Product: Cyanide, Free

Analytical Method: 9014_CYANIDE

Analytical Procedure: GL-GC-E-073 REV# 8

Analytical Batch: 1745740

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445441001	B3H3P3
445441002	B3H3P0
445441004	B3H3K2
445441005	B3H3J9
1203986685	Method Blank (MB)
1203986686	Laboratory Control Sample (LCS)
1203986687	445441001(B3H3P3) Sample Duplicate (DUP)
1203988663	445458001(NonSDG) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Miscellaneous Information

Additional Comments

Total CN levels above the MDL for Free CN were detected in samples 445441001 (B3H3P3), 445441002 (B3H3P0), 445441004 (B3H3K2) and 445441005 (B3H3J9). Free CN was performed per SOP (GL-GC-E-073).

Product: Cyanide, Amenable to Chlorination

Analytical Method: 9012_CYANIDE

Analytical Procedure: GL-GC-E-107 REV# 10

Analytical Batches: 1745739, 1745738 and 1745737

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445441001	B3H3P3
445441002	B3H3P0
445441004	B3H3K2
445441005	B3H3J9

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: Cyanide, Total

Analytical Method: 9012_CYANIDE

Analytical Procedure: GL-GC-E-095 REV# 21

Analytical Batches: 1745736 and 1745735

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445441001	B3H3P3
445441002	B3H3P0
445441004	B3H3K2
445441005	B3H3J9
1203986676	Method Blank (MB)
1203986677	Laboratory Control Sample (LCS)
1203986678	445441001(B3H3P3) Sample Duplicate (DUP)
1203986680	445441001(B3H3P3) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Sample Dilutions

The following samples 1203986678 (B3H3P3DUP), 1203986680 (B3H3P3MS), 445441001 (B3H3P3), 445441004 (B3H3K2) and 445441005 (B3H3J9) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Analyte	445441		
	001	004	005
Cyanide, Total	2X	5X	5X

Product: Cyanide, Chlorinated

Analytical Method: 9012_CYANIDE

Analytical Procedure: GL-GC-E-095 REV# 21

Analytical Batches: 1745738 and 1745737

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445441001	B3H3P3
445441002	B3H3P0
445441004	B3H3K2
445441005	B3H3J9
1203986682	Method Blank (MB)
1203986683	Laboratory Control Sample (LCS)
1203986684	445441001(B3H3P3) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Sample Dilutions

The following samples 1203986684 (B3H3P3DUP), 445441001 (B3H3P3), 445441004 (B3H3K2) and 445441005 (B3H3J9) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Analyte	445441		
	001	004	005
Cyanide, Chlorinated	2X	5X	5X

Product: Alkalinity

Analytical Method: 2320_ALKALINITY

Analytical Procedure: GL-GC-E-033 REV# 13

Analytical Batch: 1745547

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445441002	B3H3P0
445441003	B3H3T0
445441006	B3H3L8
1203986246	Laboratory Control Sample (LCS)
1203986248	445545001(B3H3R1) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL445441 GEL Work Order: 445441

The Qualifiers in this report are defined as follows:

B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).

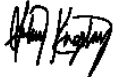
D Results are reported from a diluted aliquot of sample.

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: **Name:** Aubrey Kingsbury**Date:** 26 MAR 2018**Title:** Analyst I

Sample Data Summary

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Certificate of Analysis

Report Date: March 26, 2018

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF W18-002

Client Sample ID: B3H3P3 Project: CPRCOW18002
 Sample ID: 445441001 Client ID: CPRC001
 Matrix: WATER
 Collect Date: 06-MAR-18 14:20
 Receive Date: 08-MAR-18
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis												
9012_CYANIDE (TOTAL): COMMON "As Received"												
Cyanide, Total	D	220	3.34	10.0	ug/L	1.00	2	AXH3	03/09/18	0752	1745736	1
9014_CN (FREE): COMMON "As Received"												
Free Cyanide		3.66	1.00	2.00	ug/L		1	AXH3	03/15/18	1037	1745740	2
9012_CN (AMENABLE): COMMON "See Parent Products"												
Cyanide amenable to chlorination	B	6.00	3.34	10.0	ug/L		1	AXH3	03/09/18	0854	1745739	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9010C Distillation	SW846 9010C Prep	AXH3	03/09/18	0617	1745735
SW846 9012B	SW846 9012B Cyanide, Chlorinated Prep	AXH3	03/09/18	0651	1745737

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	9012_CYANIDE	
2	9014_CYANIDE	
3	9012_CYANIDE	

Notes:Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: March 26, 2018

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF W18-002

Client Sample ID: B3H3P0 Project: CPRCOW18002
 Sample ID: 445441002 Client ID: CPRC001
 Matrix: WATER
 Collect Date: 06-MAR-18 14:20
 Receive Date: 08-MAR-18
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis												
9012_CYANIDE (TOTAL): COMMON "As Received"												
Cyanide, Total		194	1.67	5.00	ug/L	1.00	1	AXH3	03/09/18	0651	1745736	1
9014_CN (FREE): COMMON "As Received"												
Free Cyanide		5.72	1.00	2.00	ug/L		1	AXH3	03/15/18	1037	1745740	2
9012_CN (AMENABLE): COMMON "See Parent Products"												
Cyanide amenable to chlorination	U	1.67	1.67	5.00	ug/L		1	AXH3	03/09/18	0854	1745739	3
Titration and Ion Analysis												
2320_ALKALINITY: GW 01 "As Received"												
Alkalinity, Total as CaCO3		127000	1450	4000	ug/L			RXB5	03/14/18	1540	1745547	4
Bicarbonate alkalinity (CaCO3)		127000	1450	4000	ug/L							
Carbonate alkalinity (CaCO3)	U	1450	1450	4000	ug/L							
Hydroxide alkalinity as CaCO3	U	1450	1450	4000	ug/L							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9010C Distillation	SW846 9010C Prep	AXH3	03/09/18	0617	1745735
SW846 9012B	SW846 9012B Cyanide, Chlorinated Prep	AXH3	03/09/18	0651	1745737

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	9012_CYANIDE	
2	9014_CYANIDE	
3	9012_CYANIDE	
4	2320_ALKALINITY	

Notes:

Column headers are defined as follows:

DF: Dilution Factor Lc/LC: Critical Level
 DL: Detection Limit PF: Prep Factor
 MDA: Minimum Detectable Activity RL: Reporting Limit
 MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: March 26, 2018

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF W18-002

Client Sample ID: B3H3T0 Project: CPRCOW18002
 Sample ID: 445441003 Client ID: CPRC001
 Matrix: WATER
 Collect Date: 07-MAR-18 12:21
 Receive Date: 08-MAR-18
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis												
2320_ALKALINITY: GW 01 "As Received"												
Alkalinity, Total as CaCO ₃		128000	1450	4000	ug/L			RXB5	03/14/18	1543	1745547	1
Bicarbonate alkalinity (CaCO ₃)		128000	1450	4000	ug/L							
Carbonate alkalinity (CaCO ₃)	U	1450	1450	4000	ug/L							
Hydroxide alkalinity as CaCO ₃	U	1450	1450	4000	ug/L							

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	2320_ALKALINITY		

Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: March 26, 2018

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF W18-002

Client Sample ID: B3H3K2 Project: CPRCOW18002
 Sample ID: 445441004 Client ID: CPRC001
 Matrix: WATER
 Collect Date: 06-MAR-18 12:44
 Receive Date: 08-MAR-18
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis												
9012_CYANIDE (TOTAL): COMMON "As Received"												
Cyanide, Total	D	351	8.35	25.0	ug/L	1.00	5	AXH3	03/09/18	0710	1745736	1
9014_CN (FREE): COMMON "As Received"												
Free Cyanide		3.87	1.00	2.00	ug/L		1	AXH3	03/15/18	1037	1745740	2
9012_CN (AMENABLE): COMMON "See Parent Products"												
Cyanide amenable to chlorination	U	8.35	8.35	25.0	ug/L		1	AXH3	03/09/18	0854	1745739	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9010C Distillation	SW846 9010C Prep	AXH3	03/09/18	0617	1745735
SW846 9012B	SW846 9012B Cyanide, Chlorinated Prep	AXH3	03/09/18	0651	1745737

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	9012_CYANIDE	
2	9014_CYANIDE	
3	9012_CYANIDE	

Notes:Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: March 26, 2018

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF W18-002

Client Sample ID: B3H3J9 Project: CPRCOW18002
 Sample ID: 445441005 Client ID: CPRC001
 Matrix: WATER
 Collect Date: 06-MAR-18 12:44
 Receive Date: 08-MAR-18
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis												
9012_CYANIDE (TOTAL): COMMON "As Received"												
Cyanide, Total	D	374	8.35	25.0	ug/L	1.00	5	AXH3	03/09/18	0715	1745736	1
9014_CN (FREE): COMMON "As Received"												
Free Cyanide		3.87	1.00	2.00	ug/L		1	AXH3	03/15/18	1037	1745740	2
9012_CN (AMENABLE): COMMON "See Parent Products"												
Cyanide amenable to chlorination	U	8.35	8.35	25.0	ug/L		1	AXH3	03/09/18	0854	1745739	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9010C Distillation	SW846 9010C Prep	AXH3	03/09/18	0617	1745735
SW846 9012B	SW846 9012B Cyanide, Chlorinated Prep	AXH3	03/09/18	0651	1745737

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	9012_CYANIDE	
2	9014_CYANIDE	
3	9012_CYANIDE	

Notes:Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: March 26, 2018

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF W18-002

Client Sample ID: B3H3L8 Project: CPRCOW18002
 Sample ID: 445441006 Client ID: CPRC001
 Matrix: WATER
 Collect Date: 07-MAR-18 08:25
 Receive Date: 08-MAR-18
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis												
2320_ALKALINITY: GW 01 "As Received"												
Alkalinity, Total as CaCO ₃		118000	1450	4000	ug/L			RXB5	03/14/18	1550	1745547	1
Bicarbonate alkalinity (CaCO ₃)		118000	1450	4000	ug/L							
Carbonate alkalinity (CaCO ₃)	U	1450	1450	4000	ug/L							
Hydroxide alkalinity as CaCO ₃	U	1450	1450	4000	ug/L							

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	2320_ALKALINITY		

Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary**Report Date: March 26, 2018****Page 1 of 3****CH2MHill Plateau Remediation Company****MSIN R3-50 CHPRC****PO Box 1600****Richland, Washington****Contact: Mr. Scot Fitzgerald****Workorder: 445441**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Flow Injection Analysis											
Batch	1745736										
QC1203986678	445441001	DUP									
Cyanide, Total		D	220	D	206	ug/L	6.57	(0%-20%)	AXH3	03/09/18	07:53
QC1203986677	LCS										
Cyanide, Total	50.0				48.9	ug/L	97.8	(80%-120%)		03/09/18	06:47
QC1203986676	MB										
Cyanide, Total			U	1.67	ug/L					03/09/18	06:46
QC1203986680	445441001	MS									
Cyanide, Total	100	D	220	D	304	ug/L	84	(75%-125%)		03/09/18	07:54
Batch	1745738										
QC1203986684	445441001	DUP									
Cyanide, Chlorinated		D	214	D	214	ug/L	0	(0%-20%)	AXH3	03/09/18	07:35
QC1203986683	LCS										
Cyanide, Chlorinated	50.0		U	1.67	ug/L		0	(-200%-200%)		03/09/18	07:18
QC1203986682	MB										
Cyanide, Chlorinated			U	1.67	ug/L					03/09/18	07:17
Batch	1745740										
QC1203986687	445441001	DUP									
Free Cyanide			3.66		2.64	ug/L	32.7	^ (+/-2.00)	AXH3	03/15/18	10:37
QC1203988663	445458001	DUP									
Free Cyanide		U	1.00	U	1.00	ug/L	N/A			03/15/18	10:37

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QC Summary**Workorder: 445441****Page 2 of 3**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Flow Injection Analysis											
Batch	1745740										
QC1203986686	LCS										
Free Cyanide	25.0			24.4	ug/L		97.8	(80%-120%)	AXH3	03/15/18	10:37
QC1203986685	MB										
Free Cyanide			U	1.00	ug/L					03/15/18	10:37
Titration and Ion Analysis											
Batch	1745547										
QC1203986248	445545001	DUP									
Alkalinity, Total as CaCO3		111000		111000	ug/L	0.36		(0%-20%)	RXB5	03/14/18	16:01
Bicarbonate alkalinity (CaCO3)		111000		111000	ug/L	0.36		(0%-20%)			
Carbonate alkalinity (CaCO3)	U	1450	U	1450	ug/L	N/A					
Hydroxide alkalinity as CaCO3	U	1450	U	1450	ug/L	N/A					
QC1203986246	LCS										
Alkalinity, Total as CaCO3	100000			107000	ug/L		107	(80%-120%)		03/14/18	15:05

Notes:

The Qualifiers in this report are defined as follows:

- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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QC Summary**Workorder: 445441****Page 3 of 3**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.